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FOR THE YEAR

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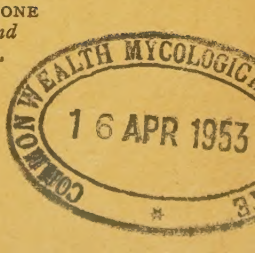

TABLE OF CONTENTS

	Page
SECTION I—INTRODUCTION AND POLICY	1
A—The Adequate Provision of Food for the People	2
B—The Cultivation of Cash Crops and the Exploitation of Wild Trees for Export Purposes	5
C—Soil Conservation	6
D—The Improvement in the Preparation Quality and Marketing of Produce	7
E—Agricultural Education	7
F—Research	7
SECTION II—THE WORK OF THE AGRICULTURAL DEPARTMENT:	
(*a*) Organisation and Staff	8
(*b*) Agricultural Circles:	
South-western Circle	8
Scarcies Circle	11
South-eastern Circle	13
Makeni Circle	14
Musaia Circle	15
Bonthe Circle..	16
Colony Circle	17
(*c*) Horticulture	20
(*d*) Research:	
Plant Pathology Section	20
Entomological Section	21
(*e*) Agricultural Education	23

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Department of Agriculture

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Annual Report of the Department of Agriculture for the Year 1950

SECTION I—INTRODUCTION AND POLICY

Early in 1950, the staff position improved considerably. All vacancies for Agricultural Officers were filled, but the posts of second chemist and laboratory superintendent remained vacant. Unfortunately the position deteriorated again towards the end of the year when two Agricultural officers and the only chemist were transferred to other territories. There was however some relief to the staff position when two of the six vacancies for Temporary Agricultural Superintendents were filled. Later in the year the newly appointed Horticulturist arrived in the country and will soon be able to relieve field officers of a considerable amount of nursery work.

2. Good progress was made in the established schemes for development and a good deal of new work was started. Agricultural officers in charge of circles were fully occupied during the year giving advice and assistance to the newly formed district economic committees. These committees, set up by Government in each district, were charged with the duty of formulating plans for the development of their districts. On the Agricultural side they were given every assistance and guidance in planning by the Agricultural Officer working in that district.

3. During the year the Soil Conservation Team, consisting of an Administrative, a Forestry and an Agricultural Officer completed their survey of the territory and presented a report on soil conservation and land used in Sierra Leone. This is a most valuable document in which all available information on soil conservation and land use is collated, together with suggestions for the future. The report is receiving the consideration of Government.

4. The basic policy of conserving soil fertility by developing swamps for annual crops and utilising the upland, as far as is practical, for permanent tree crops was continued, with increasing emphasis on the development of wetland rice in mangrove and inland swamps and the planting of high yielding types of oil-palms on the uplands. The development of central nurseries for raising improved oil-palms proceeded well. With the increased interest in cocoa, which is proving a most remunerative crop, work in cocoa areas was intensified. Organised drives against monkeys in Pujehun District proved successful for the third year and did much to reduce the numbers of these persistent pests. With the aim of improving the quality of cocoa, ten central fermenteries were started during the year, with promising results. As regards work with rice, this year has seen the start of the programme to develop Rokupr into a Rice Research Station of the first order. Unfortunately lack of materials caused considerable delay in the building programme and the recruitment of the specialist staff has not been possible. The expansion of the mangrove clearing work in the Bonthe area has proceeded well. Further trials of dry season ploughing in the Bonthe riverain area proved most successful and show that a very large potential rice growing area is ready for development there. The inland swamp schemes have progressed satisfactorily, particularly in the North, where swamp development is now firmly established.

5. Work on livestock improvement has been pogressive. The Animal Husbandry Station at Musaia is now established sufficiently for more detailed work on cattle and pasture management to be started. In the Colony area pig breeding has made good progress. The English strains of pigs having done very well, and local farmers have several good piggeries able to meet some of the local demands for meat.

6. In the field of research the Agricultural Chemist continued to study the problems of fertility in reclaimed mangrove soils. He also initiated a number of fertilizer experiments and studies in the regeneration of soil fertility through manured grass. The Plant Pathologist and Entomologist continued investigations in crop pests and diseases. The Entomologist continued his work on the habits of various tsetse fly found in this country.

7. The training of Junior staff continued at the Njala Training College. One African continued his study of Agriculture at Reading and two other Laboratory assistants continued their degree courses in Botany and Chemistry respectively at United Kingdom Universities. Two former Agricultural Students from Njala Training College are taking Higher School Certificate courses at the Prince of Wales School with a view to an Agricultural Degree course overseas.

8. The year 1950 was unusual, rainfall was extremely light at the beginning of the rains, and the dry season was unduly prolonged. There was some reduction in the upland and swamp rice production due to this, and also to a heavy outbreak of army worms in June. Subsidiary food crops were satisfactory and there was no great shortage. Exports of Agricultural produce amounted to 88,440 tons with a value of £3,649,097 as compared with 89,421 tons valued at £3,086,296 in 1949. There was a noticeable improvement in the exports of groundnuts, piassava and ginger, which offset the reduction in export of palm kernels.

9. There was no radical change in the general policy of the department, but the tempo is quickening towards mechanisation and the use of fertilisers, whilst more and more the District Councils will be encouraged to manage their own Agricultural affairs. The great expansions in crop processing, produce inspection and co-operation, initiated and fostered by the Agricultural Department in previous years, threw a very heavy burden on the staff. These lines of work assumed such proportions that special staff was required for these duties and they have now been handed over to separate departments. The Agricultural Department can now concentrate on the basic work of production. This enables the staff to devote its whole time to large scale production schemes such as improved oil-palms, mechanised rice production in undeveloped swamps, development of the cattle industry in the North, cocoa production in the forest areas, mangrove clearance schemes, fundamental research on rice and in educating local bodies to run agricultural concerns. The following is the approved policy and an outline of the more important work undertaken during the year.

A—The Adequate Provision of Food for the People

This is to be accomplished by:—

1. *The improvement and spread of swamp rice cultivation to such an extent that not only will the needs of the people be supplied in bad years but there will be a surplus for export in ordinary years.*

(i) *Mangrove Swamp Reclamation.*—This scheme for developing mangrove areas where fresh water conditions are of sufficient duration to allow rice to be grown is mainly concentrated in the Bonthe and Moyamba Districts. To the end of 1950, 1,216 farmers had received loans, and had cleared 4,338 acres. In addition loans were made to two Native Administrations for clearance schemes to be undertaken by them, and the cleared land will be rented to people of the chiefdom. These Native Administrations cleared 25 and 72 acres respectively and in addition 786 independent farmers cleared mangrove without loans. The total area cleared by this group amounts to 3,771 acres. No spectacular development can be expected immediately as the clearing of mangrove from tidal lands is most difficult, and can be dangerous to unskilled workers. No mechanical means for clearing mangroves have yet been devised, as the terrain precludes the use of any machinery. Nevertheless this scheme has added an impressive amount of rice to an area which previously produced very little.

(ii) *Saline Swamp Reclamations.*—In the Scarcies area practically all the mangrove lands suitable for rice growing without emplodering have been brought into cultivation. Interest is now turning to the development of land too saline for rice under normal tidal conditions. Surveys by Agricultural officers have shown that there are considerable areas which could be brought into cultivation if the salt free period is prolonged sufficiently for a crop of rice to mature. A small scale polder of ten acres was completed in 1949. This showed that small polders in avicennia mangrove areas can be successful. In 1950, the polder was extended by the further empoldering of 95 acres at the low cost of less than £5 per acre, using hand methods. Other surveys done during the year have made it possible to plan the development on these lines of a further 5,000 acres in the next few seasons.

The experiment at Maswari had another successful year and with improved tillage reasonable crops should be obtainable over the whole polder. Test plots by local farmers produced encouraging yields, despite the lack of rain in the early part of the season. Wellington polder still remains a problem and it appears that drainage has been carried out to an excess in parts. Certain modifications in drainage are being tried next year.

(iii) *Inland Swamp Cultivation.*—The cultivation of inland swamps during the rains for rice and in the dry season for sweet potatoes, cassava and vegetables shows steady progress; particularly in the vicinity of large towns. The main deterrent to rapid progress is the very heavy work necessary in clearing off the natural vegetation. Where the uplands are not suffering from over-farming, and the pressure of the population is not high, little interest is taken, but in other areas progress is steady. Figures of acreage cleared and planted are:—

Circle	1946	1947	1948	1949	1950
Makeni	55	127	155	214	241
Rokupr	—	23	32	38	47
Kenema	—	64	54	74	74

There is a quickening interest in this work and several more schemes have been planned for the next few years. The true results of these schemes however are to be seen in their effect upon local farming practices: many more farmers are now clearing swamps on their own initiative.

(iv) *Mechanised Cultivation of Swamps.*—In the swamp areas of the Bonthe District, on the riverain grasslands which flood deeply each year, a small trial plot of four acres of land, ploughed by a horticultural tractor in 1949, produced an excellent crop of deep water rice. In 1950 it was intended to plough a fairly large area with a crawler tractor but unfortunately this did not arrive in the country in time for the ploughing season. Instead a Fordson major was used on half tracks and managed to plough 70 acres before conditions became too difficult. The land so ploughed was handed over to local farmers who grew Indo China, a variety of rice which withstands deep flooding. The crop harvested at the end of the year was most successful, averaging over 1,800 lbs. of padi per acre. One of the main difficulties which had to be overcome was the heavy natural cover of grasses. This proved difficult to plough in unless it was first cut, dried and burnt; but on areas already cultivated this difficulty did not arise. Extended trials with a crawler tractor, which it is hoped will overcome most of the difficulties experienced with the half-track tractor, have been planned for next year. There is every sign that mechanised production on a large scale will be possible in these grasslands within the next few years.

(v) *Swamp Rice Seed Distribution.*—Quantities of improved and selected seed continued to be distributed by the department although on a smaller scale than before. Over 1,000 bushels were sent out to local farmers and the demand is still great. The departmental scheme is limited to high grade selected varieties grown under adequate supervision. Good farmers are being encouraged to grow improved seed rice for eventual sale to others who require such seed.

(vi) *Better cultivation of Inland Swamps for Crops other than Rice during the Dry Season.*—Distribution of planting materials of sweet potatoes, cassava and other crops suitable for dry season cultivation was continued from departmental stations and Native Administration farms. Particular attention is being paid to the inland swamp clearance schemes in the North. Many farmers are now finding that dry season cultivation of these swamps definitely benefits the following wet season crops of rice. At Newton in the Colony the planned used of a valley swamp has shown possibilities. Market gardening can be most profitable in the dry season, and a reasonable crop of rice obtained in the wet season, despite the poverty of the soil in this area. The initial capital required for terracing however, is heavy.

(vii) *Extension of Garden and Small Field Crops to serve as an Auxilliary Food Supply.*—Market gardening in the Colony, around the large towns in the Protectorate and in the Kabala area continued to expand during 1950. The cultivation of sweet potatoes and cassava in the swamps during the dry season and on uplands during the wet season is now firmly established. Yams are being grown on a much wider scale than before. The growing of Pigeon Pea on a field scale, as a following crop after rice on the uplands, has extended over a considerable area of the Northern Province. This crop is proving most popular there and adds to the protein diet of the farmer.

(viii) *The improvement of Livestock.*—The Animal Husbandry Station at Musaia is now well established, a further increase in the leased area bringing the Station up to 2,431 acres. Most of the essential buildings were completed and the long delayed water supply has been installed. The stock carried at the end of the year numbered 119, all Ndama breed. Two herds are maintained; one of 60 animals, selected as a beef-producing type, has thrived very well under range conditions, the average liveweight increase in calves being about 20 lbs. per month. The second herd is being bred as a dairy type, and now totals 59 animals. The changing make up of the herd, due to selection and the increase in proportion of heifers in milk, accounted for a slight decrease in total yield of milk from the herd. These heifers have been reared from animals already in the herd. During the last six years the average liveweight of calves at birth has risen steadily from 30.1 lbs. to 40.7 lbs, which shows that improved feeding and management are having an effect on the animals. The health of the animals through the year has been good and the Ndama breed is definitely suited to conditions in this country. Unfortunately there was an outbreak of rinderpest in the area round Musaia, which prevented any selection of animals for drafting into the Musaia herd. Strict quarantine was imposed on the station. Herds kept at other stations have thrived and health was singularly good.

Pigs.—The rearing of pigs of European stock continued at Newton and Njala. The main centre is Newton where pure bred Large White and Large White crosses are kept. In order to prevent excessive in-breeding two Large White boars were imported during the year from English herds unrelated to the original families. In addition one boar and two gilts (one in pig) of Wessex Saddleback breed were imported. A steady supply of breeding stock has been distributed from both Newton and Njala, 117 pigs being sold for this purpose. In addition 95 were sold for slaughter. It has been shown that good slaughter pigs can be raised in six months to an average liveweight of 150 lb. Despite fairly high prices for feeding stuffs a reasonable profit can be made by the pig-keeper. A number of pig-keepers are successfully established in the Colony area and provide a quantity of meat for local consumption. There is also an increasing interest in this work in parts of the Protectorate, although many prospective keepers have yet to learn that good feeding is most essential for success.

Small Livestock.—Rabbits have done well on a small scale at Newton and Njala. There is a considerable local demand for these animals. They breed well and if kept under good conditions, are not difficult to feed. Guinea Pigs continue to flourish at Newton and are popular with schools in the Colony. The Medical and Veterinary departments are supplied with both rabbits and Guinea Pigs for pathological work.

Poultry.—Rhode Island Red Poultry continued to be the only breed reared to supply local demand, Newton and Njala being the main centres. Production and distribution during the year were:—

	Eggs laid	*Eggs Incubated*	*Eggs sold for hatching*	*Birds sold for breeding*
Njala	2,368	892	692	14
Newton	3,455	847	1,430	77
Total	5,823	1,739	2,122	91

As in previous years chick mortality has been a serious handicap to the raising of a large flock. More than half the birds hatched succumb before they are more than one month old. Trouble has also been experienced with infertility. This was overcome to some extent by exchange of birds between stations, but it will be necessary to bring in fresh blood to the flocks as soon as possible, since all the flocks now descend from the American birds imported in 1946. Fowl pest was general the throughout the country during the year, but as the result of strict quarantine it did not occur in the departmenal flocks.

The breeding of Muscovy ducks has proved successful at both stations and 151 birds were sold for breeding or slaughter. Here again the high mortality of ducklings in the first month is a serious handicap. If the ducklings can be got through that difficult period, they then prove most hardy and do very well on free range. During the year pens of Khaki Campbell and Indian Runner ducks and two ganders and ten geese of Chinese breed were imported. So far these importations have done very well and have begun to lay satisfactorily.

B—Cultivation of Money Crops and the Exploitation of Wild Trees for Export Purposes

During 1950, the export of agricultural products showed a slight regression from the 1949 figures. The following table shows how the last three years have compared with a pre-war year 1938.

Products	1938	1948	1949	1950
PALM KERNELS				
Quantity, tons ..	63,697	66,431	76,541	71,269
Value	£457,031	£1,744,591	£2,314,038	£2,277,752
Price	£7	£26	£30	£32
PALM OIL				
Quantity	1,066	2,208	3,308	1,940
Value	16,025	115,958	186,348	105,411
Price	15	52	56	54
PIASSAVA				
Quantity	3,791	2,159	2,785	5,348
Value	40,369	88,345	118,744	273,336
Price	10	41	43	51
GINGER				
Quantity	2,705	1,318	1,395	2,383
Value	60,680	73,682	146,791	563,535
Price	22	56	105	237
COFFEE				
Quantity	38	347	257	317
Value	793	19,148	17,165	39,092
Price	21	55	67	123
COCOA				
Quantity	384	1,379	714	1,620
Value	5,849	102,941	65,627	117,212
Price	15	75	92	72
KOLA				
Quantity	1,450	1,840	1,680	1,070
Value	29,785	166,635	155,216	106,244
Price	20	91	92	99

Products	1938	1948	1949	1950
BENNISEED				
Quantity	374	350	287	804
Value	3,700	11,538	10,728	33,811
Price	10	33	37	42
GROUNDNUTS				
Quantity	Nil	890	2,454	3,465
Value	—	26,588	71,639	100,011
Price	—	30	29	29
Total tonnage All Exports ..	73,505	76,961	89,421	88,216
Total Value All Exports ..	£614,232	£2,351,920	£3,086,296	£3,616,404

NOTE—Quantities are quoted in tons. Prices are the average ruling prices during each year. These figures are quoted from export statistics, the actual monetary value to the producer would be two-thirds of these figures.

The production of palm kernels was lower than in 1949. It is felt that the country has practically attained its maximum production of palm kernels by existing methods. The method of extracting kernels by hand involves a tremendous amount of labour and with more attractive prices for some other export crops less kernels are produced. The steady rise in exports of groundnuts and benniseed is due mainly to the increase in the price offered to the producer, which has stimulated his interest in these. Groundnuts have provided a welcome cash crop for the North. Spectacular increases in piassava and ginger are due to world shortages from other sources. The extraordinary high price for ginger is causing the producer to increase his output, possibly to the detriment of other crops.

The cocoa export figures do not give a true picture of the year's production since exports are confined to the period November to March. The price offered to the producer for the 1950 crop was considerably higher than that offered in 1949, but only a portion of the 1950 crop is shown as exported. There has been considerable new planting during the last few years, but it is unlikely that export figures will reflect this for some time to come. The institution of central fermentaries, new grading and extensive propaganda is improving the grade of cocoa offered for sale to a marked extent. With the improvement in quality, combined with a considerable increase in price, this crop has received more attention than before.

The most important tree crop is the oil-palm. The plan for planting up considerable areas with improved strains of high-yielding oil-palms progressed well. Some 30,000 seedlings of these improved strains were distributed and planted out during the year. Central nurseries established in various places throughout the country supplied much greater numbers for future distribution. Over 1,000,000 seeds were sent to various agricutural stations and nurseries for this work.

Masanki plantation of 2,000 acres still provides a good quantity of seed. The commercial exploitation of this plantation is now the concern of the Produce Marketing Board.

C—Soil Conservation

As in previous years the whole policy of the department has been to preserve and improve the fertility of the soil. To attain this the development of inland saline and mangrove swamps receives great attention, as it is a valuabe means of relieving the pressure of farming on the uplands, which are so liable to erosion and deterioration if over-farmed. Investigation into the planting of permanent tree crops on the uplands, grass and fertiliser trials and animal husbandry are all directed to this end. The early burning of grasslands as a means of reducing damage to soil and natural vegetation by annual fires has been accepted in many Chiefdoms. Its practice is slowly spreading to other areas.

The Soil Conservation Team, consisting of experienced Administrative, Agricultural and Forestry Officers, completed its work during the year. This team investigated the sociological, agricultural and forestry aspects of soil conservation and collected a volume of information. Their report has been published and contains many practical suggestions and recommendations for future soil conservation work in the territory. It is a most valuable contribution to our knowledge of this subject and should prove of great use to all who have to work in the territory. The report is receiving the consideration of Government.

D—The Improvement in Preparation, Quality and Marketing of Produce

The large rice mill at Mambolo and the Pioneer Oil Mills ordered by the department in previous years were handed over to the department of Commerce and Industry. Their erection was started during the year. Hand palm kernel crackers were available in small numbers and proved very popular in the Bonthe District, but not so satisfactory elsewhere. Two power-driven cracking machines were imported by a firm, but owing to faulty design they failed to work satisfactorily.

The experimental production of copra in the Bonthe District suffered a setback owing to the sudden good demand for whole nuts for export. It proved more profitable to export whole nuts than to extract copra for processing.

During the cocoa season of 1950 ten central fermentaries were established at selected places in the Pujehun and Kenema Districts and produced Grade I cocoa from the wet beans purchased direct from neighbouring farmers. Further experiments in methods of fermentation were carried out, and it will be possible to give a standardised method which, if followed closely, will produce fully fermented Grade I cocoa. Any profits made by these fermentaries were passed back to the farmers in the form of a bonus on their sales. It is hoped that when well established these fermentaries will be run co-operatively by the farmers themselves. Improvements in fermentation are already having a big effect on the general level of quality throughout the industry.

In the piassava industry continuous propaganda was carried out by the department. The Co-operative Department started a number of piassava producer marketing societies and through these it is hoped that the quality of high grade Prime Sherbro piassava will be maintained.

E.—Agricultural Education

The training of future instructors at the Njala Training College continued. Twenty-eight students were in training, eight in their third year and fourteen in the first year of the Agricultural Course. Agricultural Officers have expressed their appreciation of this training for junior staff and are well satisfied with the trainees when they join the department.

Three members of the department continued their scholarships in the United Kingdom. Mr. J. A. C. Davies at Reading is studying for a B.Sc. Agriculture. Two Laboratory assistants are studying for pure science degrees, Mr. E. T. Pyne taking an Honours Degree course in Botany at Cardiff and Mr. J. D. Belford a Degree course in Chemistry at Leeds. Two former agricultural students of Njala Training College are taking the Higher School Certificate course in Science at the Prince of Wales School with a view to taking Agricultural Degree courses overseas.

Members of staff continued to make visits and advise primary schools in the Protectorate on the teaching of Agriculture and Rural Science.

F—Research

Plant pathology, entomology and agricultural chemistry continue as the three branches of the research side of the department, centred at the laboratories at Njala. Details of work done during the year are given under the appropriat sections. This year saw the start of the establishment of Rokupr as a Rice Research Station of the first order. It was not possible to recruit any research staff during the year but Mr. Macluskie was promoted to the post of Principal Agricultural Officer in charge and undertook the preliminary work of developing the station. Unfortunately lack of materials and engineering staff precluded any real progress in building the necessary laboratory accommodation and staff houses but good progress was made in ancillary works.

SECTION II—THE WORK OF THE DEPARTMENT OF AGRICULTURE

A—Organisation and Staff

10. The division of the country into agricultural circles was the same as for previous years, with headquarters at Njala. Demand for agricultural services, however, always appear ahead of staff and it is becoming clear that once more staff is available several of the circles might well be divided. It is still not possible to give the full-time services of an Agricultural Officer in several areas. It is hoped that this position will shortly improve.

11. Mr. R. R. Glanville, C.B.E., completed his last full year in Sierra Leone in 1950, proceeding on leave in February, 1951, prior to retirement. As a field officer of the department from 1924 to 1940 (when he transferred to Nigeria) and as Director of Agriculture from 1944 onwards, Mr. Glanville has left his mark on Sierra Leone farming in no uncertain fashion; his most valuable contribution being the introduction, multiplication and widespread distribution of overseas swamp rices, many of which are now household words amongst the farming community. The establishment of Rokupr, Musaia Livestock Station, the inception of Rice Mills and Pioneer Oil Mills, cattle ploughing and inland swamp development in the North are all notable examples of his pioneer work.

12. During the absence of Mr. G. W. Lines, on leave, Mr. A. F. MacKenzie acted as Deputy Director. Major S. M. Taylor, Agricultural Officer, was seconded early in the year to act as Director of Commerce and Industry. Later in the year Messrs. E. S. Capstick and A. P. McWilliam, Agricultural Officers, and Mr. H. W. Dougall, Agricultural Chemist, proceeded on leave and transferred to Trinidad, Nyasaland and Kenya respectively. Mr. Capstick transferred on promotion as Senior Agricultural Officer, Trinidad, after giving ten years of excellent service to Sierra Leone, latterly being a most effective member of the Soil Conservation Team. Another veteran of the department, whose last complete year before retirement was in 1950, is Mr. H. Macluskie, Principal Agricultural Officer. He has done sterling work in the Scarcies area and will be remembered there by the farmers for many years to come.

13. The loss of so many senior officers within such a short period was a severe setback to the department but was offset to some extent by the arrival towards the end of the year of a new Agricultural Officer, Mr. MacDonald, two Agricultural Superintendents, Messrs. J. Wells and J. Rippey, and the Horticulturist, Mr. H. D. Tindall. Unfortunately the post of Agricultural Chemist is still vacant and with soil and fertiliser investigations becoming increasingly urgent it is to be hoped that it will not be long before a replacement arrives. Meanwhile, much good routine analytical work is being done by Mr. H. O. Jarrett, the Chemist Assistant whilst Agricultural Officers throughout the country are carrying out field experiments with fertilisers.

14. In general, 1950 has been the first year in which the department has been able to concentrate entirely on production and pure farming. Produce Inspection, marketing and crop processing, all conceived and developed by the Agricultural Department in previous years, have been handed over as going concerns either to the department of Commerce and Industry or to the Produce Marketing Board with both of which organisations full co-operation is maintained.

B—Agricultural Circles

South-western Circle

Experimental Station, Njala

15. *Upland Grasses.*—The study of exotic and local grasses for pasture and fodder purposes and as a fallow crop continued. Certain exotic strains of *Panicum maximum* (Guinea grass) are most promising. Two dwarf strains appear to be very suitable for grazing pastures. There is some doubt whether strain C.P.I. 8389 is *Panicum maximum*. This strain forms an excellent sward and has shown a good response to fertiliser treatment. A dressing of 5 tons per acre of compost and 2 cwt. per acre each of Sulphate of Ammonia, Superphosphate and Sulphate of Potash at the time the grass was planted, gave, in the second year, an increase of 35 per cent in yield of cut grass over plots not treated.

Percentage of dry matter was not affected by the fertiliser treatment. The dwarf Strain C.P.I. 8387 is not so good in appearance as the other dwarf strain. Two strains of *Pennisetum setosum* (formerly *P. polystachyon*) compare favourably with Guinea grass. The local strain was much superior in yield of green matter to the Gambia strain and maintained its leafy growth for a longer period into the dry season; it is also more palatable to stock, as stock appear to consume about 25 per cent more green matter of this strain than of that from the Gambia. Observations on the application of fertilisers to grasses continue to show responses to superphosphate and sulphate of ammonia. The established plots of Guinea grass, used in previous years for grazing trials and cut fodder, showed a definite response to fertilisers, but have not as yet recovered to the level of yields they attained in their early years.

16. *Wetland Grasses.*—Elephant grass *Panicum purpureum* continued to show its superiority over Guinea grass under swamp conditions. An area of natural sward of *Panicum laxum* in a swamp liable to deep flooding gave disappointing results this year. The last four years' figures for cow grazing days per acre are 334, 98, 298 and 46. It appears that heavy grazing in one year has a definite depressing effect on the following year's crop. The plot of *Axonopus compressus,* despite last year's favourable impression, failed to control lalang (*Imperata cylindrica*) and had to be ploughed in.

17. *Leguminous Fodder Crops: Pueraria Phaseoloides,* continued to give good yields of high protein fodder. Cropping with upland rice after ploughing up a five-year ley gave very disappointing yields despite a dressing of compost and fertilizers. A further problem is the persistence of self-sown *pueraria* seedlings through surrounding crops. Despite its value as a cover crop and high protein fodder crop it becomes a most awkward weed which tends to smother other crops, and is difficult to eradicate.

18. *Dry Season Fodder.*—Considerable quantities of pit silage were made from various grasses and pueraria. Excellent hay was made during the latter part of the year from *P. setosum* (local) and various strains of Guinea grass.

19. *Annual Crops.*—Again, the majority of the annual crops were grown for fertilizer and manurial trials. Further trials with jute were dissappointing and continued to show marked photoperiodism. A comparison of various exotic strains of pigeon pea with the local strain showed that only one exotic, New Era "X", compared favourably in yield.

20. *Permanent Crops.*—Work on citrus, coffee and kola was confined to recording yields of individual trees for future selection work. A clonal selection of Marsh grapefruit, planted out in 1949, began yielding in the 1950-51 crop season, two clones selected from high yielding trees showing great vigour of growth and establishing much quicker than unselected plants.

21. *Oil-palms.*—The established plots of Nigerian and Angola palms, were carefully checked for individual yields and selected high yielding trees were specially marked for seed production. The old Deli plantation was under-planted with seedlings from a selected Angola palm with the intention of replacing the Deli palms with Angola. A new temporary type of heated germinator was constructed during the year, with a consequent improvement in the percentage of germination and a shorter germinating period. A consignment of three specially selected types of seed was received from the Oil-palm Research Station, Benin, Nigeria; these are of known parentage and the seedlings so raised will be used for production of seed of improved type for distribution in the country. Some 6,000 seedlings were distributed for planting in the locality of Njala and 42,000 seedlings were transplanted to nursery beds for this work next year. From the nursery a large number of economic fruit trees and ornamental plants were distributed during the year.

22. *Livestock: Cattle.*—The Ndama herd did very well during the year. With increased supplies of silage and hay available for the dry season the cattle improved considerably in appearance and health. Two large draught oxen were obtained from Musaia for work on the station.

23. *Pigs.*—These continue to do well and, with the exception of one sow exhibiting posterior paralysis and cannibalism, the herd was free from disease. New rations were compiled and fattening hogs gave liveweight increases of about 7 lbs. per week, a most satisfactory result. Forty-six pigs were sold locally for breeding purposes.

24. *Poultry.* The Rhode Island flock was maintained. Heavy mortality in young chicks, and low hatching percentage of eggs were again major troubles in rearing poultry. Certain improvements including new types of rations for young chicks and the exchange of cockerels with Newton Station brought about some improvement. 2,368 eggs were incubated and 892 sold for hatching. The flock of Muscovy ducks did not do so well as in the previous year, duckling mortality was high, but there was an improvement towards the end of the year. Five ducks and one drake of each of the Indian Runner and Khaki Campbell breeds were imported from the United Kingdom towards the end of the year; all are thriving.

Extension Work

25. *Inland Swamp Development.*—Propaganda was continued to encourage the wet and dry season cultivation of swamps. Pujehun District continued to show an increase in the area under rice, despite an exceedingly heavy attack of Army Worms early in the season. In the Bo District the area under rice declined, but there was increased activity during the dry season for garden crops. A small trial was carried out in the flooded grasslands in Pujehun District, to gain information prior to considering a mechanical cultivation scheme. It is evident that early sowing must be done in the lower areas of these grasslands to ensure the rice is sufficiently advanced to withstand the flooding. Yields in successful plots were just under 3,000 lbs. padi per acre.

26. *Mangrove Clearing Scheme.*—Sixty-three new loans were issued, totalling £291 during the year, mainly in Bumpe and Ribbi Chiefdoms. The Bumpe Native Administration, which started to clear mangrove by contract following a loan of £100, had a setback owing to a dispute with the fellers over rates of pay. This was cleared up and to the end of the year 25 acres were cleared at a cost of £42. By the end of 1950, 1,304 acres had been cleared with the assistance of loans from the scheme, of which 825 acres were farmed. Other clearings by farmers not assisted by loans totalled 3,318 acres of which 2,687 were farmed in 1950.

27. *Cocoa.*—Intensive work on this crop, particularly in Pujehun District continued through the year. A drive to destroy monkeys for the third year in succession again proved successful. A bounty of 6d. per head was paid and 13,039 monkeys were destroyed. As in previous years nearly 95 per cent of those destroyed were proved to be harmful to cocoa. With a view to improving the quality of prepared cocoa five small fermentaries were started at centres in the cocoa area during the year. Money was provided for the capital costs of buildings by the Sierra Leone Produce Marketing Board and this amounted to less than £40 per fermentary. A loan was also given to cover working costs until the cocoa was sold. Four of the fermentaries worked very well, a total of 38,582 lb. of wet cocoa beans being purchased and processed, from which 14,609 lb. of Grade I, 141 lb. Grade II and 39 lb. of Grade IV cocoa were produced. Wet cocoa beans were purchased at 4d. a pound and after the sale of graded cocoa a bonus of 0.4d. per pound was paid to the farmers who brought in wet cocoa beans. A census of cocoa farms in the Circle showed an increase of 324 acres of newly planted cocoa during the year.

28. *Oil-palms.*—Work continued along the lines of previous years. Small nurseries, mainly at chiefdom towns, raised some 21,000 seedlings during the year despite difficulties of seed supply and germination. 8,604 seedlings, covering 121 acres, were planted out during the year by farmers with the advice of the Department. A survey of the wild oil-palm belts, including analysis of the fruit, was done during the year.

29. *Piassava.*—Considerable assistance was given to the Co-operative Department in the Potoru-Zimmi area where several small producers Co-operative Societies have been started for this produce. Demonstration and instruction in proper preparation were given. The quality purchased by these societies was improved considerably, and they are a reliable medium for propaganda.

30. *Coffee.*—With the continued rise in price for this crop there is a comparable increase in interest. The quality of the crop has been fairly satisfactory. Some 300 acres of new plantings were established during the year. The sustained interest in the Liberica type has given satisfaction to Pujehun District.

31. *Ginger.*—The extraordinary high price offered for this crop, at times reaching £240 a ton, caused considerable attention to be given to this crop. Haste to market the crop resulted in poor preparation, and considerable propaganda and instruction were necessary. As a result of the high prices there was a rush to plant up as large an acreage as possible at the onset of the rains. The area planted is estimated to have quadrupled the previous years planting. In Bo District the estimated acreage jumped from 1,508 acres to 9,438 acres.

32. *Soil Conservation.*—As in previous years the scheme for early burning of the grass fields in Moyamba District continued, with good co-operation from the chiefdoms concerned. Progress in other directions is still slow, but the steady increase in mangrove clearance, inland swamp farming, and also in permanent crops such as oil-palm, cocoa and coffee is encouraging.

33. *Native Administration Farms and Staff.*—Only two farms were maintained; these were satisfactory. Native Administration demonstrators continued to give valuable assistance to cocoa farmers and also helped to maintain the oil-palm nurseries in various chiefdoms.

Scarcies Circle

34. *Rice Research Station, Rokupr.*—The extension and improvement of the experimental Farm at Rokupr to establish a major commodity research station was started during the year. Owing to shortage of staff and materials little progress could be made in the construction of the necessary buildings although good progress was made with small ancillary buildings required for the farm. The recruitment of research staff was delayed.

35. *Rice Selection.*—Work on selection and multiplication of swamp rices suitable for conditions in Sierra Leone continued. Sixty-one varieties, imported at various times from other countries, were maintained under observation; these included seven new varieties or strains from Tanganyika, six from North Borneo and four from Orissa, India. Eighty-six varieties of local origin were also maintained. One hundred and ninety-eight single line selections from local varieties were also under observation and examination. Re-selection of proved strains was continued to maintain genetic purity for multiplication purposes. The collection of local varieties of rice continued; this included some upland rices of which the white grained types have been selected for future work. Some of the re-selections have given promising results and showed improved yields over unselected seed. During the year a list of all known varieties of rice, with notes on their characteristics, and a key to their identification, was completed and circulated to all officers of the Department. Five hundred and eighty-eight bushels of pure seed strains suitable for distribution in the country were raised; these included Ngasein 57, India pa lil 46, Kavunginpoothala 12 and Indo-China 70. Selections of rices were also sent to other countries on request.

Experiments on Water Control.—The experimental polders again proved that complete denial of normal tidal flow over the land produces soil toxicity. Partial control whether during the rains or the dry season does not materially affect soil conditions. An underground system of faggot drains did not prove satisfactory as the soil tends to become too dry and yields were adversely affected. Other small experiments on soil management were carried out on the farm; results so far are insufficient to lay down any definite guide for general use. Several experiments with fertilizers were laid down by the Agricultural Chemist and promised well.

36. *Other Crops.*—As in previous years improved varieties of yams, sweet potatoes and pigeon peas were grown for multiplication and distribution. Some 3,853 seedlings of improved types of oil palms were raised and 683 were distributed from the station. The usual propagation and distribution of economic plants and ornamentals continued. New strains of guinea grass and para grass were obtained for trial in the station.

37. *Livestock.*—The small herd of Ndama cattle numbering 34 head at the end of the year, continued to thrive and maintained good health all through the year.

General.—A considerable amount of work was carried out on the new buildings and layout in connection with the programme of work for establishing the research side of the Station. This occupied a considerable portion of the time of the officer-in-charge.

EXTENSION WORK

38. *Swamp Clearance Schemes.*—The clearance schemes in the tidal mangrove areas have progressed well. Small scale schemes for reclamation of these areas have produced good results. The Bakepet empolder of 10 acres in Avicennia mangrove land reclaimed in 1949, was extended by reclaiming a further 95 acres at a cost of £4 13s. 10d. an acre. The original empolder produced a fair crop in its first year of use. Several surveys by officers were carried out in the circle, particularly in Samu Chiefdom, where small scale polders made by local farmers have been extending over the past few years. These surveys have shown that there is considerable scope for further development and plans are being made accordingly. New inland swamp schemes were also started, and the area cleared now totals 47 acres. Plans for further development are in hand.

39. *Oil-Palms.*—The programme of propagating and distributing oil-palm seedlings throughout the Circle was well established during the year. A total of 10,225 seedlings were distributed and a further 11,291 were raised in the nurseries for the next year's distribution. The two main nurseries are at Rokupr and Port Loko, with several small nurseries at Native Administration farms. The small plantations of improved types of oil-palms proved a valuable source of seed for this work. Surveys of the dense oil-palm belts of the Circle were undertaken ; these gave information for the siting of a proposed Pioneer Oil Mill.

40. *Irrigation and Drainage Schemes*—The large scale reclamation schemes at Luti and Rosino showed some improvement. The areas subject to free tidal wash produced reasonable crops of rice, and showed good responses to fertilizers. Behind the check bund the only crops to do well were cassava and *pueraria phaseoloides* as a cover crop.

41. *Mechanized Farming.*—The TD6 crawler tractor did good work on the marginal lands round the farm, but owing to lack of spare parts it was not possible to carry out any large scale trials. The Fordson fitted with half tracks was sent to Bonthe for trials on the grasslands. The pigmy thresher proved successful and plans for its use in the district were made on the results of the trials.

42. *Seed Multiplication and Distribution.*—Rokupr continued as the centre for production of pure seed rice. 507 bushels were distributed in the circle to farmers for bulk multiplication and 120 bushels were supplied to the South-western circle. In addition 206 bushels of pure seed of improved strains of rice grown on the farm were distributed to selected farmers. This will be grown by the farmer and rogued under the supervision of the Department. The Department will then purchase the bulk of the crop for distribution elsewhere, both in Sierra Leone and to other territories, such as the Gambia, requiring seed rice.

43. *Rice Mills.*—As the Department of Commerce and Industry took over all work on the processing of crops, the projected Rice Mill at Mambolo was handed over to their control. The No. 1 Planters Mill at Rokupr was sold to a local trader, and re-erected at Kasiri further down the river. He is operating it quite successfully although spare parts are a difficulty.

44. *Pests and Diseases.*—A heavy outbreak of Army worms (*Laphygma exempta*) occurred in June and did considerable damage to the rice nurseries. Well established rice seedlings recovered after the initial attack, but newly germinated rice was killed off. There was a second out-break in July, but this caused little damage as most of the rice was well advanced.

SOUTH-EASTERN CIRCLE

EXPERIMENTAL FARM, KENEMA

45. The study of measures to maintain fertility in an upland swamp continued. Further work has confirmed that manuring is essential if the level of fertility is to be maintained. Green manuring is equally effective with grass or compost although rice seems to give better results with green manures. Fairly heavy dressings are required. There are also indications that dry season cultivation for vegetables, has a beneficial effect on the succeeding wet season rice crop. An observation plot using artificial fertilisers showed that rice responded to ammophosphate and sulphate of ammonia. The Farm continued to raise quantities of seed rice, mosaic resistant cassava and oil-palm seeds of improved type for distribution. The Angola palms planted in 1947 started to fruit during the year. A small herd of Ndama cattle continued to do well on the farm. A few Rhode Island Red poultry were kept, but chick mortality was a serious problem.

46. *Substation Waiima.*—This is proving successful although better water control over the swamp is required. Rice during the wet season and sweet potatoes in the dry season were grown in the swamp, as well as cassava and yams on the uplands, for distribution in Kono District. A small plantation of Angola palms was established for future seed supplies.

EXTENSION WORK

47. *Swamp Development Schemes.*—A further five acres of swamp were developed in one chiefdom, but of the 74 acres cleared and planted in previous years 54 acres were fallowed. It is fortunate that the area has still large reserves of good high bush for upland farming. In consequence there is no sense of urgency amongst the farmers to develop swamp land for permanent cultivation.

48. *Native Administration and Staff.*—Twenty Native Administrations voted a total of £1,917 for agricultural development work during the year. Eighteen Native Administrations employ demonstrators for work on specific crops mainly cocoa, though in two chiefdoms the main interest is in propagation of fruit trees. The number of Native Administration farms has been reduced, and several are being restricted to propagation of oil-palms of improved type for distribution within the chiefdoms concerned.

49. *Cocoa.*—The intensive planting of new cocoa farms carried out in 1949 received a severe setback in 1950 when, owing to the unusually long dry season and very late rains much of the 700 acres had to be replanted. Other new plantings were however done on a considerable scale. Intensive propaganda on methods of fermentation continued. As in the South-western Circle four small fermentaries were set up in suitable areas, in addition to the one started in 1949 as a pilot scheme. These purchased 11,448 lb of wet cocoa and sold 4,218 lb of prepared cocoa. The average price per lb paid for wet beans was 3½d. Unfortunately owing to the small quantities handled the overhead costs were unduly high. It is evident, however, that there is considerable scope for this work in the cocoa areas. Two co-operative cocoa marketing societies were started by the Co-operative Department. One at Ngihun in Dama Chiefdom was most successful and has a promising future, the other at Gorahun Bongre had certain difficulties which it is hoped it will overcome next year. A fair sized plantation of established cocoa at Gegbwema was rented from a local farmer for experimental work by the Department. This will be used for trials with fertilisers, pruning trials and other methods of management. A cocoa exhibition was held in Kenema on 28th November for the second year in succession and was a great success. This year other agricultural exhibits besides cocoa were shown.

50. *Coffee.*—Planting of this crop is still extending although there is now a marked preference for cocoa where conditions are suitable for it. The 1950 crop was below normal. Hand-driven Coffee hulling machines were lent to several farmers with big plantations. The utility of these machines is now appreciated and several farmers are contemplating purchasing power-driven machines for their own use.

51. *Oil-Palms.*—A survey of wild oil-palm stands throughout the Circle, including analysis of fruit, was carried out. The most easterly chiefdoms appear to have palms with a much higher percentage of mesocarp in the fruit than the westerly chiefdoms. There are indications that the Moa River valley may have superior types of palms to those found in the Sewa valley. Small test plots of young palms were planted in the grassfields in Kono District to test sites for possible future development. Small nurseries for raising improved seedlings have been established in various chiefdoms. Work was started on the Baoma Pioneer Oil Mill, and this should be ready for work early in 1951. This mill will exploit the wild oil-palm belt in Leppiama Kandu and Simbaru Chiefdoms, which was surveyed the previous year.

Makeni Circle

Experimental Farm, Makeni

52. Multiplication of suitable rice for inland swamps continued, the average yield being 1,117lbs per acre of padi. The average is lower than in the previous year, as the result of lack of water, particularly during the early growth period after transplanting. The low lying plots with adequate water did not suffer and produced good yields. Sughandi and No 79 were again the highest yielding varieties. Mississippi variety of sweet potato is still the most popular for dry season cultivation. Musaia cow pea, maize and tobacco were grown as dry season crops with success. Dry season cultivation has a definite improving effect on the succeeding wet season crop of rice. An experiment has been laid down to test the effects of different types of dry season crop. Four types of tobacco were grown, Bourbon, Magnum Prior, Jamaican Hybrid and " Makeni " Hybrid. There was little noticeable advantage of flue curing over air curing. The small "Makeni" type of cigar proved most successful and there was a great demand locally for them.

53. On the uplands a variety of crops were grown. Local varieties of pigeon pea still proved better than exotic strains. Groundnuts were very poor, the problem of " blindness " (seedless pods) proved even more troublesome this year and it is difficult to find an explanation. Smooth Cayenne Pineapples were still in great demand. The bananas on the margin of the swamp did not do so well as in past years and it seems necessary to give them a dressing of manure.

54. The station also started to raise large numbers of oil-palm seedlings of improved type for distribution and a greater part of the nursery was devoted to this work. The young seedlings grew very well under pigeon pea used as a shade crop. 4,338 seedlings were issued for planting and 32,363 are available for next year's planting programme.

55. The livestock held on the farm consisted of fourteen working oxen, some trained and others in training. Some will be made available for farmers wishing to start ploughing in the district.

EXTENSION WORK

56. The inland swamp development schemes have continued to progress. The total area cleared is now 241 acres of which 231 acres were cultivated during the wet season. Three of the schemes were not very successful, mainly due to good upland bush still being available in the district. Dry season cultivation of these swamps increases slowly and is confined largely to cassava and sweet potatoes.

57. The demonstration holding at Kamakwie continued satisfactorily despite a setback in establishing some of the upland crops. The holder also lost his poultry from the prevalent " fowl pest ". Despite these difficulties there was no necessity to pay a retaining fee this year as a nett cash profit of £48 was made from the holding.

58. *Ploughing.*—There was a most satisfactory increase of interest in the use of ploughs in the Circle. Six Native Administrations have continued to use ox ploughs successfully. The biggest development is the Mabole Valley Scheme. Here it is intended to develop mixed farming in a fertile valley in Biriwa, where Madingo farmers have settled. A loan scheme has been approved whereby seventy farmers can obtain a loan of £10, repayable in three years, to purchase oxen and ploughs. Sixty ploughs have already been purchased; these will be available for the next ploughing season. A large quantity of old barbed wire has been made available at a very low cost to enable farmers to control grazing and make proper Kraals and paddocks for their animals.

59. *Oil-Palm Development.*—This has made excellent progress. During the year 12,053 seedlings of improved types of oil-palm were planted out in the Circle. The biggest difficulty is to get farmers to open up big enough holes before planting out. Small plantations have suffered more damage from pests than the large ones, and those planted in grassfields are more susceptible to damage from "Cutting Grass". It is expected that nearly 60,000 seedlings will be available for planting out in 1951.

60. *Sub-stations and Native Administration Seed Farms.*—Makali sub-station continues to demonstrate correct upland and swamp utilisation, and produces seed and planting material for distribution. Work on raising oil-palm seedlings has been intensified. Mabonto oil-palm nursery made good progress. Two new Native Administration nurseries were opened during the year and one Native Administration farm was closed down for various reasons. The swamp farms gave disappointing yields, but this in the main was due to the unseasonable weather. In all, eight farms produced 352 bushels of seed rice of good varieties.

61. *Market Gardening.*—This is on the increase in the Circle, particularly round the big towns, where the swamps are being used intensively for this work. Two farmers have made exceptional progress and, with the advice of the Department, are producing quite large quantities of vegetables, no doubt at a satisfactory profit.

MUSAIA CIRCLE

62. *Animal Husbandry Station.*—Further progress was made on the building programme and by the end of the year most essential buildings were completed. The long delayed water supply has now been installed although not in its final form. This now enables a larger herd of stock to be carried on the station. A further 1,311 acres of land were taken into the station, making the total leased area 2,431 acres. A telephone system has been installed, connecting Musaia with Kabala, and proved of great value.

63. *Cattle.*—A few more Ndama cattle were purchased locally during the year. Unfortunately a serious outbreak of rinderpest occurred in the surrounding districts: the station was isolated and no further movement of stock to or from the station was permitted for the rest of the year. The two herds have continued to thrive. The beef herd totalling 60 animals, thrived well under range conditions, the average liveweight increase in calves being about 20 lb. per month and the average birthweight 36.2 lb. The second herd, of dairy type, now totals 59 animals. The record of this herd first started in 1944, is:—

Year	*Total Milk produced*	*Average per Cow per Lactation*	*Total No. of Cows Milked*	*Average No. of Cows Milked*	*Average length of Lactation*	*Average birth weight of Calves*
	lb.	lb.			days	lb.
1944 ..	10,136	390	26	8	152	30.3
1945 ..	12,356	722	16	9	203	34.1
1946 ..	13,955	1,077	18	8	337	35.0
1947 ..	15,925	1,108	18	9	294	35.4
1948 ..	16,917	1,225	21	10	285	38.1
1949 ..	19,202	1,381	19	10	263	39.1
1950 ..	17,714	*1,151 (*237 days)	18	11	237	40.7

This shows a slight decrease compared with 1949, the changing make-up of the herd and the increase in numbers of heifers in milk accounts for the fluctuation. These heifers have been reared from animals already in the dairy herd. The steady increase in the average birthweight of calves shows that good management and feeding are having an effect. In six years the average birthweight has increased by over 25 per cent A statistical analysis of all records of milking animals has indicated that the dark coloured animals are better milk yielders than the light coloured ones; this interesting point requires further investigation. The production of dairy produce is again higher than in previous years. 644 lb. butter, 52 pints cream and 54 lb. of cheese were sold from the farm.

64. *Cropping.*—The area of land cleared or thinned by the end of the year was 328 acres. Some of this was not clear felled, but had strips of trees left along the contours as an anti-erosion measure. The trees retained were mainly *Parkia sp.* Thirty-eight acres of pure stands of selected grasses were established during the year. Five acres of Guinea grass (local strain) and 10 acres of *Andropogon gabonensis* were successfully established by interplanting through maize and top dressing with artificials Guinea grass has so far shown the most promise. Multiplication of other types of grass, both exotic and locally selected, was begun for future planting. Eighty-four acres of food crops were grown. Yields were disappointing, partly on account of the light rains, but principally due to labour shortage, which spread the planting season over too long a period, much of it being planted rather late in the season. A manurial trial on Musaia cow pea gave an average of 890 lbs. per acre: this is a good yield for a short duration crop. Groundnuts and maize, the bulk of the crops grown, were poor Sunflower, sweet potatoes and rice were fair. Cassava and pigeon peas showed satisfactory growth.

EXTENSION WORK

65. The small substation at Kabala was maintained. A good irrigation system has been laid out and a dry season crop of rice was grown successfully. Variety D 114 gave 2,591 lb. per acre and No. 79 gave 1,429 lbs. per acre, an encouraging result. Wet season rice was satisfactory. Vegetable cultivation is good and seed production is promising. Nigerian onions (*Gindin Tassa*) were grown successfully. Considerable quantities of planting material were distributed, including 1,928 oil-palms and 550 coconuts.

66. The problem of settlement of the Fula cattle owners was studied in conjunction with the Administration. A quantity of barbed wire was made available at a low price, and sold well. Enquiries were also made into the possibilities of owners of large herds of cattle using cream separators for the preparation of "Fulah" butter. The outbreak of rinderpest prevented much work being done during the later part of the year.

BONTHE CIRCLE
EXTENSION WORK

67. *Mangrove Clearing Loan Scheme.*—During the year £206 was issued to 39 new farmers and 6 farmers who had loans in previous years. New fellings during the year are estimated at 238 acres. Steady progress has been made and there is a growing interest amongst the local farmers in this work. Progress will nevertheless be slow as the rate of clearing is limited by lack of skilled fellers.

68. *Riverain Grasslands.*—The previous years' test, on a small scale, of the possibilities of mechanical cultivation in the lowlying grasslands of the Sewa-Waanji flood plain having proved successful a full track Fordson County tractor was ordered. Unfortunately it did not arrive in the country in time for the ploughing season. A Fordson Major on half-tracks was loaned by another station. In the short time it was available it ploughed 69 acres at Subu, using a Ransomes Hussar Disc plough. The Motrac Mouldboard plough was not suitable for the conditions, where heavy grass cover had to be ploughed-in. The half-track although doing good work proved difficult to manoeuvre, the front wheels tending to dig in when the soil was soft or rough. With all these initial difficulties the cost of ploughing was unduly high. When straightforward work with no undue stoppages can be done the costs should be reduced considerably. The area ploughed was sown with deep water rices by local farmers, except for 2 acres used by the department to grow seed rice.

The average yield obtained over the whole area was not less than 1,800 lb. padi per acre, a most satisfactory result. Each farmer managed to sow and reap about 8 acres. This is approximately five times what can be cropped by hand methods and the yield per acre is much higher. It is estimated that the eight farmers who used the area obtained crops to the total value of nearly £1,000. The results are most encouraging and further extension of this work is planned for next year, using a full tracklaying tractor.

69. *Oil-Palms.*—Further planting out of improved types of oil-palm was done during the year, 1,733 seedlings being planted in five chiefdoms. In addition to the six nurseries formed in 1949, one new one was started; these are all run by Native Administrations. A rough survey of the wild oil-palms in the Circle was carried out during the year, and this included analysis of the fruit composition. There were considerable variations in the percentage of mesocarp. Palm nut cracking machines are still in demand but delivery of new machines, and in particular of spare parts, is disappointing. Three power driven machines were imported, but owing to bad design they failed to work satisfactorily. One has been modified by a local engineer, the others remain unsold. There are now eleven machines owned and used by Native Administrations and seven, including one power-driven, owned by private individuals. More would be used if they could be obtained.

70. *Piassava.*—Production of high grade Prime Sherbro is still very limited but continuous propaganda has helped to maintain the standard. The total exports of all grades has increased by nearly 70 per cent over previous years. Preliminary steps were taken for the establishing of a Piassava experimental station at Solon in Nongoba Bullom Chiefdom. This station will carry out investigations on the methods of preparation of this crop and the proper methods of managing the wild Raffia palm areas for better production. The two piassava co-operative societies have both increased their membership and continue to receive advice and assistance on the production side. They have sold Prime Sherbro grade at good prices.

71. *Copra.*—With the removal of restrictions on the import of fresh nuts to the United Kingdom, the production of copra has dropped to almost nothing. The price of fresh nuts for the export trade exceeds the proportional value of copra produced from them.

72. *Produce Inspection.*—This work is now being undertaken by the Department of Commerce and Industry.

Colony Circle

Experimental Station, Newton

73. The farm policy continued on previous lines, combining stock farming with intensive valley cultivation under irrigation, evolving anti-erosion technique and establishing economic tree crops and pastures on the upland.

74. *Pigs.*—Since 1945 commercial rearing of English pigs predominantly of Large White strain, has proved itself the most profitable line in the farming system evolved at Newton. During 1950, eight boars, eighteen gilts and 41 weaner pigs sixteen weeks old and over were sold for breeding purposes, 81 animals were sold for slaughter. The total revenue amounted to £1,418. In addition, the pig manure produced has been of great value to the rice and market garden crops grown in the two irrigated valleys. Adequate supplies of feeding stuffs have been increasingly difficult to obtain and their price has continued to rise. In 1950 110,000 lb, costing over £420 were fed to pigs. Consequently it has not always been possible to feed an ideally balanced diet. Nevertheless an average liveweight of around 150 lb at six months has been maintained and a breeding boar weighing 184 lb at six months (184 days) was reared. With the exception of two sudden deaths, believed due to hæmorrhagic septicæmia, the health of the pigs during the year has been good and the provision of a balanced mineral mixture to supplement the diet has greatly benefitted the herd. The tendency to weak bone structure, so prevalent amongst stock in previous years, has entirely disappeared. Newly born litters have at times shown a tendency to scour,but the use of a proprietary anti-scour mixture has proved highly efficacious.

Nursing sows have been allowed out on free range and litter weights of up to 300lb per litter have been obtained during an eight-week period. In 1950 five pedigree pigs were imported from the United Kingdom, consisting of two Large White boars, one Wessex Saddle-back boar and two gilts of the latter breed, one of which was received in pig. This latest introduction of foundation stock of approved type and quality should have a marked effect upon the Newton herd and later upon the local pig-keepers stock. The sale of in-pig gilts has been a little above average, but there has been a marked increase in the sale of young weaners. The sale of boars is not encouraged since it has been found that, after one or two services, these animals have been slaughtered. Every encouragement is given the local pig-keepers to loan their boars and there are encouraging signs, though as yet small, of co-operation amongst themselves.

75. *Cattle.*—The herd of Ndama cattle, as maintained at Newton, is not an economic proposition as a producer of meat and milk. The great value of the herd is in the production of much needed farmyard manure for the " hungry " Newton soil. The standard of the Stock continues to be improved by careful selection and good management and the animals continued to thrive throughout the year.

76. *Poultry.*—Breeding and distribution of Rhode Island Red stock, started in 1940, has continued and has generally kept pace with the persistent demand in the Colony area for birds and eggs of imported strains. Forty-nine cockerels, 28 hens and 1,430 eggs were sold locally, compared with 393 and 614 respectively in 1949. Newton was fortunate in suffering very few losses from the local periodic outbreaks of fowl pest. The ever-present risk of the spread of this very virulent and contagious disease, and indifferent fertility of eggs, a high chick mortality and an average yearly egg production of only 53 eggs per bird in 1950 are still seemingly insurmountable obstacles to large scale poultry development on economic lines. With ducks, duckling mortality has been high. During their first three weeks they have shown great susceptibility to a disease believed to be caused by one of the Salmonella organisms. After this period surviving young stock have grown well and maintain excellent health. During the year over 100 birds were supplied to the Freetown market. Towards the end of the year twelve Chinese Geese and twelve each of the Khaki Campbell and Indian Runner Breeds of Duck were imported from the United Kingdom. Multiplication of these birds will be carried out with a view to distribution to local applicants in due course.

77. *Small Livestock.*—Rabbits and guinea pigs continue to be bred quite successfully on a small scale and local interest in rabbits has continued Supplies of rabbits have been insufficient to meet the local demand owing to increasing commitments to supply the Veterinary Department, to whom 70 animals were distributed in 1950. Colony schools have been able to obtain their limited requirements of Guinea pigs for dissection purposes in the classroom.

78. *Crops—Valley Cultivation.*—The two intensively cultivated valley smallholdings, one started in 1941 and the other in 1946 as demonstration to the Colony market gardeners, were continued during the year. These smallholdings, which are designed to produce rice in the rains and vegetables under simple irrigation during the dry season with fruit trees of all types on the terraced slopes, are now in a satisfactory state of productivity. To the list of those crops which have been proved by experience to be best for this type of farming can now be added Native and Canton ginger and turmeric. The rice variety D114, gave an average yield of 1,983 lb., and 761 lb., per acre respectively in the two valleys. Musaia cow pea has proved a useful soil improver and is extensively grown during the dry season in plots of indifferent fertility.

79. *Upland Cultivation.*—The upland soil at Newton, typical of most of the uplands in the Colony area, is degraded and it is clear that to produce annual crops such as cassava, yams and sweet potatoes, heavy applications of farm yard manure or compost are needed. The establishment of grassland has continued to receive particular attention, but newly planted paddocks were a partial failure owing to the very low rainfall recorded in July and August. Existing Guinea grass paddocks deteriorated as a result and lalang continued to establish itself as a serious weed. Multiplication plots of *Pennisetum setosum* and the dwarf strain of Guinea grass did well and withstood the drought. *Setaria kasungula* is a palatable grass, but it did not become well established owing to the unfavourable weather conditions.

80. *Economic Tree Crops.*—The nursery for the propagation of economic trees continued to supply budded citrus and mango as well as a variety of fruit seedlings to meet local requirements. Established small plantations of citrus, mango, avocado and cashew have produced satisfactory crops. Amongst the citrus fruits Marsh grape fruit and Genoa and Villa Franca Lemon have yielded well and above average. Of the mangoes, the early fruiting Njala varieties and Julie yielded well; others, noticeably the variety Peter, were severely attacked by insect pests. Avocado pears gave a satisfactory yield bearing in mind the exceptionally heavy crop produced in 1949. Cashew trees continued to thrive and are clearly suited to these poor sandy soils. The farm policy is now laying greater emphasis on the establishment of improved varieties of oil-palms and a furher 20 acres of Deli palms were transplanted. The 3-acre plantation of Angola palm, first begun in 1945 and completed in 1949, is thriving and the earliest planted trees are now bearing.

81. *Reclamation of Saline Swamps.*—There are two cleared saline mangrove areas, Maswari and Wellington, both supervised from Newton. Investigations continued at both places to perfect a system of rice growing which, if successful, could be applied to large areas of saline mangrove swamp in the Colony.

82. *Maswari.*—This was originally started in 1938 as a ten acre polder in Avicennia mangrove situated about half-a-mile from the Ribbi river. These ten acres were bunded and had complete water control. In 1950, in the four acres retained by the department, the rice variety Sughandi produced an average yield of 1,211lb of padi per acre which, considering the very dry conditions immediately following transplanting, was satisfactory. A further 75 acres were empoldered in 1945 and here five one-quarter-acre test plots were planted with D114 rice, with yields varying from 664lb to 132lb of padi per acre. Unlike previous years no replacements of dead seedlings were made and while yields in 1950 were low, the high percentage of replacements made in previous years vitiates the value of any information previously obtained on growth and yields in these plots. Results here and in the original ten acres have indicated that a period of several years cultivation after the original felling is necessary before good rice crops can be expected. Since 1947 local farmers have cultivated six of the original ten acres and cultivation within the extension empolder, begun in 1949 was extended in 1950 and totalled eighteen and a half acres. Yields have been promising, except in those instances where farmers delayed transplanting, waiting for the ' rains '. In 1948 an half acre trial plot on the banks of the Ribbi river was cleared and grew a good crop of rice without any empoldering. This was increased to two acres in 1949. In 1950, as in the previous year, the river remained brackish for a very much longer period and results were disappointing. In 1951, it is proposed to make a trial of using the more salt-resistant Pokkali strains of rice. Results so far have shown the variety Lead to be most tolerant of the brackish conditions which exist.

83. *Wellington.*—Following the chemical investigations of the toxicity which has developed, an improved system of drainage was affected by the Land Drainage Branch of the Public Works Department during 1950. With additional drains and a second sluice gate to supplement the existing ones it was expected that not only would drainage be made more effective but that toxic ground water would be less likely to exist within the root range of growing plants. The second sluice gate however was not operated until the end of September and with the August and July rainfall well below average these hopes were not fulfilled. Of the four departmental test plots one, which has given a consistently high yield since 1945, produced 1,821lb of padi per acre, while the remainder only yielded from 120 lb to 160 lb. A total area of 32½ acres was rented by local farmers and yields can be summarized as: good to fair—twenty-six lots; fair to poor—sixteen lots: failed and not harvested—eighteen lots. An estimate based on the yield of 1/40th of each plot indicated that yields of 2,700lb of padi per acre were obtained by one lotholder in a favourable soil position.

84. *Waterloo Oil-palm Plantation.*—This was originally started in August 1949 and aims at the establishment of improved varieties of oil-palms on approximately 1,000 acres of the old airport site. The installation of a pumping plant with a piped water supply to the nurseries, which cover an area of approximately one and a half acres, has greatly assisted the successful establishment of some 40,000 seedlings,

variety Deli, which will be ready for transplanting in 1951. During the year under review some 28 acres were planted up on the site and 4,000 seedlings were distributed to local applicants within the circle. Losses due to wild animals were most severe on plots intercropped with rice and where seedlings were planted along brushed lanes through the natural vegetation of grass and bushes. First results would seem to indicate that intercropping with cassava and pigeon pea is most favourable to the growth of newly transplanted seedlings, and probably reduces the depredations of wild animals. It is hoped to be able to ascertain the best technique for the establishment and management of newly planted plantations from the experience obtained at Waterloo.

(*c*) HORTICULTURE

85. The newly appointed Horticulturist, Mr. H. D. Tindall, arrived at the end of September. He was stationed at Njala for the rest of the year. Work at first was restricted to obtaining all possible information on the cultivation of fruit and vegetables. All Agricultural Stations were visited as well as other areas believed suitable for vegetable production. Experiments to find a wilt-tolerant variety of tomato, by selection from local strains, were initiated and also an investigation into the effect of various soil treatments necessary to control tomato wilt and eel worm infestation.

86. A study of seed supply and storage also received attention as well as the suitability of various types of vegetables for different parts of the country. The establishment of an Horticultural Station in or near Freetown was delayed owing to difficulty in finding a suitable site.

(*d*) RESEARCH

Plant Pathology Section

87. The Plant Pathologist, Mr. F. C. Deighton, O.B.E., reported as follows:— The Plant Pathologist left Sierra Leone on leave on April 19th, 1950, and returned in November. He attended the 7th International Botanical Congress at Stockholm in July, and spent a period of eight weeks during August–October at the Commonwealth Mycological Institute working on material collected in Sierra Leone during the previous tour. Two short papers were prepared for publication. Mr. A. B. Katta was appointed Laboratory Assistant on 13th July and assumed his duties at Njala on 1st November, 1950.

88. Some 250 collections of fungi were made during the year and sent to the Commonwealth Mycological Institute, duplicates being placed in the herbarium at Njala.

89. The Plant Pathologist continued in charge of the Agricultural and Forestry phanerogamic herbarium at Njala, and during the year about 100 collections were sent to the Royal Botanic Gardens, Kew, duplicates being placed in the herbarium.

90 *Citrus*—Scab (*Elsinoe Fawcettii* Bitanc. and Jenkins). Unfortunately, during the early war years, several thousand scabby budded citrus trees were distributed from Njala, budwood having been taken from diseased trees at Old Njala which were scheduled for destruction after the 1939/40 harvest of fruit. It is no longer practicable to search the country in order to eradicate scabby trees (a job that was thought to have been more or less completed by late 1939), though it may be possible to keep Agricultural Stations free from the disease for some time. Scab was introduced to the nursery and plots at New Njala probably from 1940 to 1942 and has evidently persisted to a greater or less extent in the nursery since then. It appeared in quantity on sour orange seedlings there early in 1950. All sour orange seedlings were destroyed and all budded plants defoliated and pruned back to short stubs; a treatment which seemed to benefit the budded plants as well as being effective in eradicating the disease for the time being. Rokupr and Makeni Agricultural Stations appear to be free from scab.

91. A certain number of budded St. Michael oranges in Njala nursery in mid-February, after severe pruning, showed a curious leaf mottle, quite distinct from nutritional mottling. The pale yellowish-green chlorotic zone extended from near the base of the leaflet along the mid-rib and irregularly along the lamina, sometimes almost to the leaf margin and over most of the leaf. The chlorotic area had an irregular

margin and was sometimes, but not always, by the linking arcuate veins near the leaf margin and sometimes, but not always, by the lateral veins. Occasionally, chlorosis appeared between the veins, the mid-rib and lateral veins remaining green. Sometimes only one side of a leaf was affected; sometimes an area on both sides of the leaf half way between the mid-rib and margin. The chlorotic area was slightly stunted in growth hence the leaf margin became sinuously puckered. When one side of the leaf was more chlorotic than the other the mid-rib was curved.

92. The disease was suspected of being of virus origin and the affected plants were destroyed. None of the parent trees from which budwood was taken, however, show the symptoms.

93. *Groundnut.*—Collections of groundnut leaf spot from various parts of Sierra Leone showed that the leaf spot caused by *Cercospora arachidicola* Hori is widespread while *C.personata* (Berk. and Curt.) Ellis, appears to be relatively rare, though common at Njala where it causes defoliation.

94. *Maize.*—Rust (*Puccinia polysora Underw.*), though common in most parts of Sierra Leone during the year, was not so severe in 1950 as in 1949. This may be due to the light rainfall in May and the unusually dry spell in late July to August which is normally the wettest period of the year.

95. *Miscellaneous Records.*—Dr. R. W. G. Dennis has kindly identified a number of collections of Sierra Leone discomycetes. The commonest species occurring on dead branches of standing trees around Njala appears to be *Encœlia heteromera* (Mont.) Nannf., orange coloured outside with apothecium yellow-brown becoming chocolate. Dr. Dennis described two new species from Sierra Leone (Kew Bulletin 1950, page 170). *Unguiculella cæspitosa* on dead twigs of cacao, and *Pezolepis naucleae* parasitic on leaves of *Nauclea latifolia* (*Sarcocephalus esculentus*).

96. Thanks are also due to Mr. H. J. Howard for the identification of more Sierra Leone myxomycetes, and to the staff of the Commonwealth Mycological Institute for identification of numerous collections and assistance with others.

97. Other new records for Sierra Leone include: *Cercospora Mangiferæ* Koord, common and widespread causing a spot on older leaves of Mango, but of no economic importance, and *Uromyces gladioli* P. Henn, on the wild *Gladiolus klattianus* from Samu Chiefdom.

Entomological Section

98. The Entomologist, Mr. F. A. Squire, reported as follows:—

The Entomologist was on vacation leave from 10th December, 1950, to 22nd February, 1951.

Crop Pests

99. *Army Worms.*—From May to July rice, millet and maize throughout Sierra Leone were subjected to unusually severe attacks by the army worms *Laphygma exempta* and *L. exigua*, the first appearance of which were noted by the writer at Musaia on 26th May as 2nd instar larvæ; thus it was evident that the eggs must have been laid about the 16th of May.

100. In the Scarcies caterpillars were first reported to the Agricultural Officer on 12th June and continued to cause alarm until 26th June when there was at least a lull. Reports of a second outbreak started coming in on 12th July and continued until about the 16th when it abated, presumably as a result of the heavy rains. In the Makeni area the attack started in June and finished earlier. By the 31st of July no trace of any worms could be found. It appears therefore, from what is known of the life history that there had been two complete cycles—a major one from May to June and a minor one in July.

101. Young rice plants of less than five days old which are still drawing on the reserves stored in the seed, and which do not yet possess a well established root system, are liable to be killed out by a severe attack of caterpillars, and some small patches of this kind were seen where farmers had to resow. This was especially the case near Kunkuna (Kambia District). In the Scarcies it was upland nurseries which were attacked. After visiting some of these nurseries, however, the impression was obtained that the rice was reasserting itself. In the Makeni area and parts of Mende country swamp rice and nurseries escaped severe damage, but many upland farms were defoliated. Cases in which fields of rice were entirely destroyed were rare. The main reason for the loss of crop in a good many farms, however, appears to be that when once there had been an attack by caterpillars farmers grew despondent and reluctant to weed farms in which the crops were quite obviously doing well despite the setback due to the caterpillars.

102. *Control Measures.*—Apart from a few localised dusting operations with gammexane powder in the departmental rice nurseries at Rokupr, it was not possible to carry out any control measures on account of the widespread nature and very short duration of the attacks.

103. *Eulophonotus Myrmeleon—Cacao Stem Borer.*—Adults of this important pest of cacao were bred out from cacao tree cuttings received from Pujehun District late in 1949 and identified by the Commonwealth Institute of Entomology. The Larva tunnels medium size branches and the trunks of young (three to four year old) cacao trees which, in some cases, die. The presence of larvæ is always indicated by the ejection of sawdust-like particles from holes in the trees. In mild attacks the insertion of powdered camphor and/or kerosene into these holes and plugging them with mud have proved effective control measures. Borer attacks were severest in neglected and abandoned plantations, thus indicating the necessity of keeping plantations clean as a preventive measure.

Tsetse Fly Investigations

104. These were continued along the same lines as last year. Some of the results have been published in two papers in the Bulletin of Entomological Research entitled: (i) "Seasonal variation in the incidence of *Trypanosoma vivax* in *Glossina palpalis R.–D.*" and "Observations on mating scars in *Glossina palpalis R.–D.*" A visit was made to the West African Institute for Trypanosomiasis Research at Kaduna in Nigeria.

Population Studies

105. Population studies by the light trapping method were continued. Twenty-one new species were added to the collection and further information was recorded regarding the seasonal variation in the incidence of different species.

The Egg Diapause of Zonocerus Variegatus

106. This investigation was necessarily suspended owing to the scarcity of the insect during the past year.

Apiculture

107. A start was made with modern beekeeping at Musaia Stock Farm by the transfer of two swarms from Newton to Musaia on July 21st. By the end of the year the swarms had increased to five. The wax moth, *Galleria melonella L.*, however, has been very troublesome causing the loss of swarms, but steps are being taken to keep it in check.

108. The temper of our bees, it may be stressed, is one of the main drawbacks to the extensive adoption of modern beekeeping in Sierra Leone, and unless steps are taken to introduce a milder strain there does not appear to be much hope of progress in the undertaking.

Reference Collection

109. The lists of identified insects received from the Commonwealth Institute of Entomology included 73 species new to Sierra Leone, of which 21 were insects caught in the light trap at night.

(*e*) AGRICULTURAL EDUCATION

110. There were twenty-two agricultural students in training during the year; of this number eight were in the third year and fourteen in the first year of their course. In December, two first-year students had their scholarships terminated as they failed to reach the requisite standard. One first-year student resigned at the end of the year for personal reasons.

111. The third year students, recruited in 1948, received lectures in English, Mathematics, Livestock Management, Animal Nutrition, Genetics, Entomology, Plant Pathology, Surveying and General Agriculture. The first year students received lectures in English, Mathematics, Agriculture, Farm Management, Nursery Practice and Elementary Chemistry, Botany and Zoology. Lectures were combined with practical work both in the field and the laboratory wherever this was possible.

112. As usual a considerable amount of practical work was done by the students on the College Farm and Nursery. On the farm forty-eight budded grapefruit (Marsh and Forster) were transplanted on the fourth Permanent Strip, and seventy-five Robusta coffee seedlings were planted out on the newly extended sixth Permanent Strip. Both the grapefruit and the coffee were received from the Agricultural Officer, Njala. Routine maintenance and upkeep of all permanent tree crops on the farm were carried on throughout the year. A cultivation demonstration with the Anzani " Iron Horse " Tractor was carried out on Annual Strip No. 5, which was later put down to a simple regeneration trial using different methods of fallowing. 5,000 grapefruit were distributed to the students mess and the staff.

113. There have been considerable changes in the nursery during the year and all the work has been done by students. Individual terraces, carefully surveyed and levelled, have been established. A new potting shed was erected. The raising of seedlings and growing of vegetables continued throughout the year. Some three hundred sour orange seedlings were raised for budding stock; some of these were supplied to the Departmental nursery, Njala, and the remainder transplanted in nursery beds. The use of Pigeon Pea as a dry season " shade " has been tried out with a considerable amount of success. Fresh vegetables were available for the students mess during the year. Nursery work in the College was carried out in conjunction with visits to the Departmental nursery for observation and practice in budding and grafting. A large collection of economic and ornamental plants was identified and several specimens transferred to the College nursery for rearing, with the object of ultimately planting up in the compound.

114. In the livestock section of the farm the rearing of calves was continued, the average weekly increase in weight of each animal being 2–3 pounds. Unfortunately, early in the year the piggery was burnt down and the keeping of pigs had to be temporarily abandoned except for one boar kept in isolation and used periodically for experimental work by the Entomologist. During the course of the year the students planned and built a second piggery, and it is hoped that in-farrow gilts will be acquired from Newton early in 1951. Stock accommodation is at present inadequate and is the limiting factor in the development of livestock keeping on the farm. It is hoped that the accommodation problem will be eased in the next year or so and to this end new paddocks for grazing animals were laid down during 1950. These paddocks are in the process of being planted up with different grasses (two paddocks were completed during the year) and in future students will have the opportunity of carrying out grazing trials with different types of stock. The poultry flock was maintained and egg production was satisfactory. The layout of a new system of poultry runs, enabling rotational use and flock sanitation, was started in the latter part of the year. During the year students built a new poultry house and nesting box, as well as designing models suitable for the peasant farmer to construct in local materials. The rabbits continued to do well and it is hoped to multiply them in future for use as dissecting specimens in the laboratory.

115. One of the innovations this year has been the " Farm Diary " Class on the first and last Fridays in each month. During the first Friday the student in charge of the farm for that month puts forward his programme of work for criticism and discussion. The student's programme is usually accepted in a modified form and at the end of the month he must give an account of his bailiffship and state how far his plans have been carried out. These " farm diaries " have proved to be very popular, interesting and instructive. Students have taken an intelligent interest in the running of their farm and show their ability to make decisions. The staff have found these classes of interest and value in perceiving individual student's problems and differences of opinion. During the second and third Fridays of the month the Farm Diary Classes are replaced by lectures from specialist and outside officers of the Department. In all cases lectures are followed by discussion. We have been indebted during the year to Mr. F. A. Squire, Entomologist, for a series of lectures and also Mr. H. W. Dougall, Agricultural Chemist for several lectures. Periodically Agricultural Instructors visiting Njala have been kind enough to talk to students and where, as in the case of Mr. Atere-Roberts, these Instructors are ex-members of Njala Training College, they have been able to pass on useful information to the present students.

116. In September the third year group of students went on a tour of instruction with the Agricultural Officer, Training College. On this tour the group visited Makeni Farm and Musaia Livestock Farm, both departmental; also Native Administration farms at Kamaranka, Kamalu and Kamakwie, the Swamp Development Scheme at Kamakwie, a progressive farmer near Kamakwie and the departmental sub-station at Kaballa. Later in October, whilst visiting Freetown to sit Language Examinations several students took the opportunity of visiting Newton Livestock Farm on their way back to Njala. In November, at the suggestion of the Deputy Director of Agriculture the third year students visited the cocoa areas in the Pujehun District and spent ten days working with Agricultural Instructors in the cacao fermentaries.

117. The students were also given the opportunity of carrying out three field experiments on upland rice, cassava and sweet potatoes respectively. The upland rice experiment comprised:—

(i) two varieties of rice,

(ii) two methods of sowing,

(iii) two manurial treatments,

and from it the following general conclusions were drawn:—

(*a*) " dibbled " rice gives a higher overall yield than broadcast rice even though only slightly more than half the amount of seed rice is required for dibbling than in broadcasting. (This confirms the conclusions drawn from an experiment on upland rice in 1949).

(*b*) there is a marked response to manurial treatment.

(*c*) of the two varieties, Gbondobai responds more and does better under improved conditions, i.e. dibbling and manurial treatment, than does Glaberrima. Both the cassava and the sweet potato experiments were designed to show the response of the crop concerned to manurial treatment. This was demonstrated extremely well in the cassava experiment where the yields were almost trebled by adding compost and fertilisers combined. Unfortunately, due to stealing, the value of the sweet potato experiment was nullified, though such information as was gained indicated that there had again been a marked response to treatment.

G. W. LINES,
Director of Agriculture.

DEPARTMENT OF AGRICULTURE,
NJALA, VIA MANO.